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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/903,999	07/12/2001	Tomiichi Hasegawa	SUGIM38.001AUS	2249

20995 7590 01/16/2003

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EXAMINER

ARTMAN, THOMAS R

ART UNIT	PAPER NUMBER
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2882

DATE MAILED: 01/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/903,999

Applicant(s)

HASEGAWA, TOMIICHI

Examiner

Thomas R Artman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 July 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☒ Claim(s) 11-15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 and 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION***Information Disclosure Statement***

The information disclosure statement filed February 19th, 2002, fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because there isn't any English translation provided for SU 1,640,542. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609 ¶ C(1).

Claim Objections

Claim 11 is objected to because of the following informalities: it appears as though the dependency should be upon claim 8 rather than claim 1. This modification will remove some lacking antecedent problems. The examiner will examine the claim upon the merits that it is dependent upon claim 8. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 7 is rejected under 35 U.S.C. 102(b) as being anticipated by Martin (US 5,712,704).

Martin discloses all of the structure in is anisotropy measurement device (Fig.1), including:

- 1) preparing a single polarized light beam (item 21),
- 2) introducing the single polarized light beam into a sample to be measured (item 2),
- 3) dividing the single polarized light beam into two light beams after passing through the sample (item 12),
- 4) superimposing the two divided light beams (item 12), and
- 5) observing an interference pattern of the thus obtained superimposed light beam (item 3).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6 and 8-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gutierrez (US 5,706,084) and in view of Yeh (EPO 209,721).

Regarding claims 8 and 11, Gutierrez teaches a standard arrangement for anisotropy analysis with beams superimposed through the sample generally shown in Fig.1 and described in col.6, lines 44-65, including:

before a sample to be measured in anisotropy:

1) a laser source to generate and oscillate a light beam to be used in anisotropy analysis (item 22),

2) a light polarizing means (item 26) that separates the light into two orthogonally polarized light beams, and,

after the sample to be measured in anisotropy,

3) a light beam analyzing means (item 32) that superimposes the two light beams with corresponding planes of polarization in order to produce interference, and

4) a detector for observing the resulting interference pattern.

Gutierrez does not specifically teach physically splitting the beams prior to polarization rotation and recombining them before the sample, or the reverse process of physically splitting

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the beams, rotating polarization of one of the beams and then recombining the beams after the sample.

Yeh teaches of an equal path Mach-Zehnder arrangement (Fig.1) for splitting the superimposed orthogonally polarized beam from a sample being measured in anisotropy using a polarizing beam splitter (item 24), rotating the polarization state of one beam relative to the other using a half-wave plate (item 30), and recombining them using a half-mirror in order to produce an interference pattern (item 38) that is projected onto a detector (item 40). This structure takes advantage of having a high tolerance for noise through common-mode rejection and can be made quite small (p.2, Summary, 1st par.).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Yeh's means as Gutierrez's polarizing means and analyzing means. Yeh's structure is a functional equivalent substitution of Gutierrez's analyzing means that would be appreciated by one skilled in the art. Also, one skilled in the art would readily recognize that Yeh's structure would work in the reverse direction: if one were to imagine taking Yeh's equal path arrangement and place Gutierrez's linearly polarized laser source at the detector position, Yeh's structure would successfully split the beam into equal parts using the half mirror, rotate the polarization of one beam with the half wave plate, and recombine the beams with the beam splitter. As recited above, Yeh states that the equal path structure allows for near perfect noise suppression through common mode rejection and can be made extremely small if necessary.

Regarding claims 9-10 and 12-15, Gutierrez also does not teach the use of half wave plates, half mirrors, or polarization beam splitters.

With respect to claims 9 and 12, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a half wave plate as taught by Yeh for the simple fact that it is well recognized in the art for use as a simple way to rotate a polarization mode by 90^0 . It is fundamental knowledge in the art that orthogonal polarization modes are required in order to minimize crosstalk between the beams during propagation through the sample along the same optical path.

With respect to claims 10 and 13-14, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a half-mirror for the initial splitting (from the laser source) and final recombination (before the detector) of the light beams since the relative intensities of the two beams must be as even as possible for accurate detection of the interference pattern.

With respect to claim 15, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a polarization beam splitter for a light beam splitting means as taught by Yeh. It is the simplest, straightforward method known in the art for distinguishing orthogonal polarization modes. This function is crucial to the functioning of the device since the polarization state of one beam must be rotated to match the other for proper interference at the detector.

Regarding claim 1, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the structure as applied above against claims 8 and 11 would satisfy the method including:

- 1) preparing two light beams having the same wavelength of which the plane of polarization are crossed at a given angle,
- 2) introducing the two light beams into a sample to be measured in anisotropy at the same time,
- 3) rotating the plane of polarization of one of the two light beams by the given angle so as to correspond to that of the other of the two light beams after passing through the sample,
- 4) superimposing the two light beams, and
- 5) observing an interference pattern of the thus obtained superimposed light beam.

With respect to claim 3, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the structure as applied above against claims 8 and 11 would satisfy the method, including the superposition of the of the two light beams prior to introduction into the sample.

With respect to claim 5, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the structure as applied above against claims 8 and 11 would satisfy the method, including crossing the beam directions (a.k.a. beam polarization) for introduction into the sample.

In regards to claims 2, 4 and 6, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the structure as applied above against claim 9 would satisfy the method, including the provision that the given angle is 90^0 .

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Conclusion


The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lee (US 5,949,546) discloses the use of an equal-path polarization control structure in an interferometric motion sensor; Kitagawa (US 5,604,591) discloses an interferometric arrangement for phase measurements of a phase mask; Shirley (US 6,341,015) teaches crossed optical paths for noise reduction.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas R Artman whose telephone number is (703) 305-0203. The examiner can normally be reached on 8am - 5:30pm Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

TRA 
January 10, 2003


EXAMINER
JAN 10 2003